June 30th. First X-ray.
July 2d. Hæmoglobin, 60 per cent.; leucocytes, 22,500.
3d. Second X-ray.
3d. Hæmoglobin, 62 per cent.; leucocytes, 17,812.
5th. Third X-ray.
6th. Hæmoglobin, 63 per cent.; leucocytes, 16,000.
7th. Fourth X-ray.
8th. Hæmoglobin, 65 per cent.; leucocytes, 14,500.
9th. Fifth X-ray.
10th. Hæmoglobin, 63 per cent.; leucocytes, 12,000.

A note of this date says: "A great many more tumors have appeared, and those that were present have increased very much in size and in darkness of color. The patient has become very much weaker, and has to have hypodermics of morphine to relieve the pain arising from the above-referred-to growth in the abdominal cavity."

It seemed as if the X-ray treatment was having a direct detrimental effect, and in the interest of the patient it was discontinued. The patient was accordingly discharged from the hospital unimproved July 14, 1902.

When in Philadelphia, in March, 1902, my friend Mr. Wilbert, of the German Hospital, expressed himself to me as having a very strong conviction that large, rapid-growing sarcomata were accelerated in their growth by the application of the X-rays, and it occurred to me at that time that possibly it would be found that in these cases the leucocytes, the natural defenders of the organism, were rapidly diminished by the employment of the rays. This apparently is what did occur in the case above detailed. To be sure one case does not constitute a rule, but I would earnestly urge X-ray therapeutists to have their work in this class of cases checked up by a frequent examination of the blood, especially as regards the leucocytosis. It also seems to me that our physiological friends should furnish us with a careful study of the effect of the X-rays upon the blood condition of the normal individual.

MIXED TUMORS OF THE THYROID GLAND.

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MIXED tumors have been found in the following places: in the ovary and testicle, in the kidney, and in the salivary and lacrymal glands. They have also occasionally been found in the cervix uteri and in the vagina, in the bladder, and in other places. It will, therefore, be seen that mixed tumors occur mainly in glandular organs. It is further noteworthy that the mixed tumors in the various glands have, within certain limits, each their characteristic constituent tissues.

The mixed tumors of the generative glands are the most complicated ones, containing frequently parts of different organs and tissues. The kidney tumors contain glandular structures situated in sarcomatous tissue, and frequently striated muscle fibres. A combination of cartilage and epithelial or endotheliomatous formations is characteristic of the tumors of the salivary glands. The mixed tumors have always had an especial significance in so far as their existence served as an argument in favor of the origin of tumors generally from displaced embryonal cells. Wilms especially has lately reviewed the mixed tumors of different organs, and has tried to show that they are all essentially of the same nature. He explains all mixed tumors as originating from embryonic cells, either actually displaced or at least functionally detached from their normal environment. These cells may later on give rise to mixed tumors. The different tissues found in one mixed tumor are, according to him, all derived from cells ceasing to develop at one stage of embryonic life. The earlier this stage is the greater is the variety of tissues these cells are able to produce; and each cell has the power to produce a tumor-like formation containing all those cells which also in the course of normal development would have been produced by it. This conclusion does not seem to be absolutely justified by the facts gained by experimental embryology. It presupposes that each embryonic cell has only (to use a term of Driesch) that *prospective potenz* which under the conditions of normal development it really displays; therefore Wilms assumes that a mixed tumor of the kidney —*e. g.*, which consists of gland structures (of mesodermal origin) and of striated muscle fibres—must be derived from cells of an embryonic stage, where the differentiation into the Wolffian body and in the myotome had not yet taken place, therefore, from what he terms a "mesoderm cell." This assumption presupposes that a cell even under changed conditions of development can only give rise to the generations of cells it would have formed under normal conditions. This, however, does not seem to be the case. It is well known that isolated blastomeres up to the sixteen-cell stage proceed in their further development not as parts of a whole organism forming the specific tissues or organs they would have produced if they had remained in connection with the other blastomeres, but they continue to develop as whole embryos. An ovum developing under the influence of one-sided pressure gives rise to normal embryos; also no specialization of the first blastomeres under these conditions seems to have taken place. Experiments with the injection of teased embryonal tissues into adult animals (Féré, Birch-Hirschfeld and Garten, Galleotti and Ville Santa) are not conclusive in their results with regard to this question. It is uncertain which of the tissues which can be found later on have really developed from cells which would have formed these tissues also under normal conditions. Of great importance, however, seem to be the recent experiments of Spemann. He found in triton, at a stage when the medullary plate is already indicated, that by tightening a ligature across the medullary plate the anterior end of the posterior part will form a head just as the anterior part will do. Under these conditions ear vesicles can be formed from parts which, if the development had proceeded normally, would not have formed any part of the head. Through injection of isolated cells such structures have not yet been formed. Probably the connection of these cells with a large part of the embryo is necessary for this result. At a somewhat later stage of the embryonic development a new head is not formed at these places. So much can be concluded from these experiments that the "prospective potenz" of embryonic cells under certain conditions is larger than could be recognized without experimental tests. *It is therefore at present not possible to determine from the composition of a mixed tumor from what kind of embryonic cells such a tumor is derived. It also proves that heterotopic formations are not of necessity produced by displaced blastomeres.*

Mixed tumors may from the beginning be malignant, or may after an apparently benign period assume this character. The facts known at present do not offer any explanation for malignant growth. Experimentally, displaced embryonic or adult cells have not been found to produce malignant tumors. Some thus far unknown factor must therefore be added to produce malignant tumors out of such cells if the displacement (or functional disconnection) plays any essential part at all in the production of mixed tumors. Wilms himself admits that some other factor besides the disconnection of cells may have to be present for the production of a tumor, although, at other places, the mere fact that these disconnected growing cells do not find the tension of their normal environment opposed to them seems to be sufficient to him to explain the malignant growth. Further, Wilms believes that all mixed tumors are of embryonic origin, owing to displacement or functional disconnection of embryonic cells, even if these tumors do not manifest themselves until later in life. Because there exist transitional tumors connecting complicated mixed tumors with simple sarcomata, these simple tumors have, according to Wilms, to be explained on the same basis. Wilms does not apply this conception to carcinoma, for which he admits a different etiology. This theory of Wilms as to the origin of *all* mixed tumors from displaced or functionally disconnected cells is, of course, not proven, although it is probable in the case of a number of tumors. There are, however, certain mixed tumors for which this explanation is improbable, namely, the mixed tumors of the thyroid gland.

The mixed tumors of the thyroid gland which I have found recorded are of two kinds. There are, first, three undoubted cases of mixed carcinoma and sarcoma, and two doubtful cases. I shall report here a further case of carcinosarcoma in which there can be no doubt about the diagnosis. Secondly, I have found records of two tumors composed of sarcomatous tissue and bone.

The cases of carcinosarcoma reported are the following:

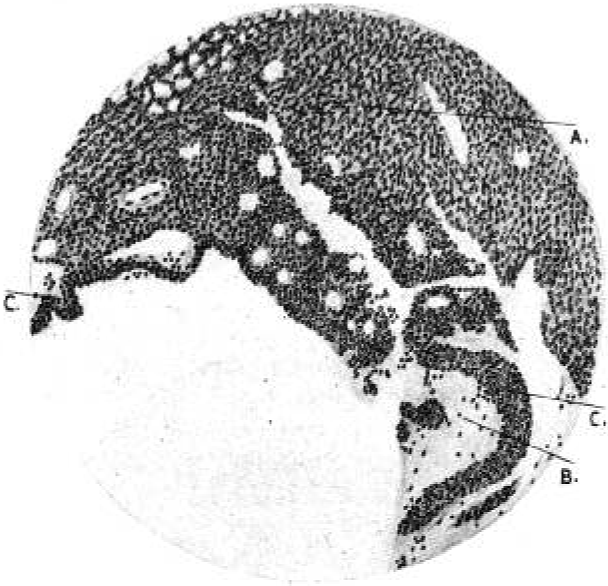
CASE I.—C. Kaufmann, in "Die Struma Maligna," describes a tumor in a man, aged sixty-seven years. The left lobe of the thyroid presented the appearance of a follicular struma. The right lobe, considerably enlarged, reached from the hyoid to the jugulum, and consisted in the centre of fibrous tissue. Around this fibrous nucleus, and especially toward the trachea, the tumor was a spindle-shaped sarcoma. The periphery toward the right side presented the appearance of a typical carcinoma, occasionally including normal gland structure. The zone where sarcomatous and carcinomatous tissue met was small; the sarcoma cells replaced here the ordinary connective tissue stroma which surrounded the carcinomatous alveoli. The interstices, which were filled with sarcomatous tissue, were enlarged. The carcinomatous alveoli were well defined toward the sarcomatous tissue. There were (metastatic?) nodules present in the periphery of the kidneys.

CASE II.—E. Kummer, "Sarco-adénome du Corps Thyroide ayant Simulé une Strumite Simple." The patient, Mrs. P., aged fifty-five years, had suffered for several years previously from a thyroid which slowly increased in size. A month before operation the growth began to increase rapidly. The left lobe of the thyroid only was affected, the right lobe being normal. The tumor consisted in the periphery of vesicles lined with cylindrical cells and including colloid. In the central part there could be found between the glandular parts large fusiform or oval cells separated from each other by very little intercellular substance. This interglandular tissue became larger further away from the periphery. At other places sarcomatous cells only were found, and again at other places only tubules consisting of cylindrical epithelial cells. These tubules were pressed against each other, no connective tissue being present between them, and the membrana limitans being preserved. A vein in the anterior part of the tumor was occluded by a thrombus consisting of fibrin and adenomatous tissue with cylindrical or cuboidal cells. Clinical symptoms suggested the presence of metastases in the lungs. No autopsy, however, could be obtained. From an anatomical point of view, Kummer designated the epithelial part of the tumor as an adenoma and not as a carcinoma, and believes it to be derived from the parathyroid rather than from the thyroid. Clinically, however, it was malignant. Of special interest is the fact that only one lobe, namely, the left, was affected.

CASE III.—H. G. Wells, "Multiple Primary Malignant Tumors: Report of a Primary Sarcocarcinoma in the Thyroid of a Dog, with Mixed Sarcomatous and Carcinomatous Metastases." This tumor was found in a Skye terrier bitch, twelve years old. The tumor affected both sides of the thyroid gland. The epithelial part of the tumor consisted of alveoli which were partly filled with colloid material, partly with cells. These alveoli were separated from each other by the ordinary connective stroma. The sarcoma consisted of spindle cells, mostly arranged perpendicularly to bloodvessels. There were many vessels and many karyokinetic figures present. As a rule, connective tissue separated the carcinomatous and the sarcomatous parts, but in some places the sarcoma infiltrates the carcinoma. In the cervical glands the metastases were carcinomatous. In the lungs, which were filled with metastatic nodules, most of them were pure carcinoma, some mixed carcinosarcoma. Kidney, heart, and small intestines showed sarcomatous nodules.

CASE IV.—A further case I observed in a white rat. I used the sarcomatous part of this tumor for transplantations, and have therefore referred to this tumor in the paper describing the results of those experiments.[1] This mixed tumor was found in a full-grown rat. The tumor, which was hanging from the neck, was about 7 centimetres long, and measured from 4 to 5 centimetres in the other dimensions. This tumor hung so far from the neck of the rat that it touched the ground. It felt solid and moderately hard. About 2 centimetres from the neck, on the pendant portion of the tumor, there was a constriction encircling it and dividing it superficially into two lobes. During the operation the tumor was found to contain a small central cavity filled with straw-colored fluid. The color of the tumor in this region was white. Besides the small central cavity no cysts were macroscopically present. In trying to enucleate the tumor at the neck it was found that it had surrounded important bloodvessels and nerves of the neck, and this

FIG. 1.



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[1] Further Investigation in Transplantation of Tumors. Journal of Medical Research, vol. viii.

fact prevented the possibility of saving the life of the rat. At this time it was observed that the tumor had a somewhat different color at the upper part near the neck, above the constriction; but no special

FIG. 2.

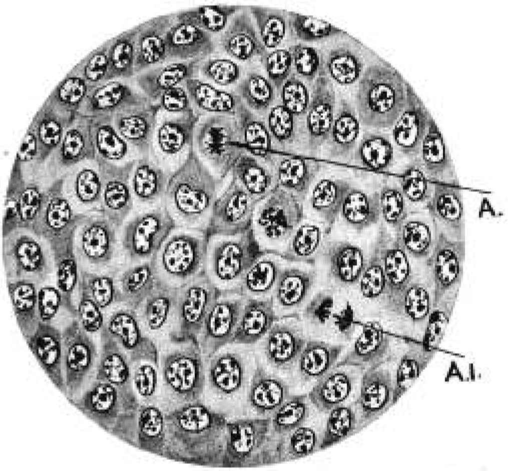
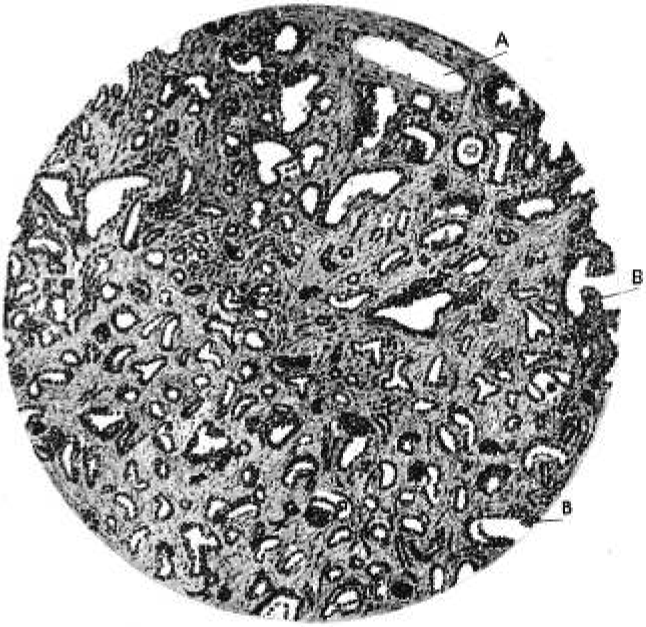
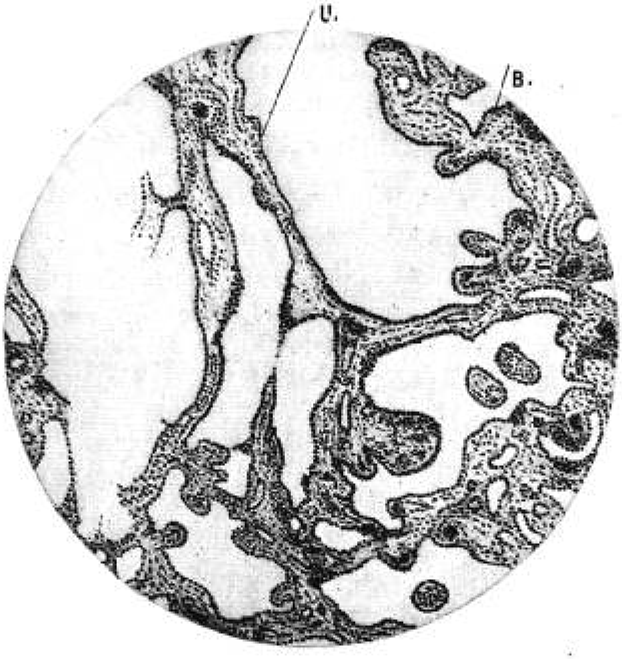


FIG. 3.



significance was attributed to this fact, and no pieces from this upper part were transplanted. Later on microscopic examination showed that the part near the neck (probably the part above the constriction) was adenocarcinomatous, but that the main mass of the tumor, which was white in appearance, was a sarcoma. In one lung a small nodule was found which showed sarcoma-like tissue around a bloodvessel, with mitoses in each section. It is very probable that we have here a beginning metastasis of the sarcomatous part of the mixed tumor of the thyroid. Further microscopic examination of the main tumor showed that the sarcomatous part consisted of spindle cells with, at different places, a somewhat varying amount of intercellular substance. The sarcomatous character was well marked, and at many places mitoses could be seen. At other places some degenerative changes had taken place, the nuclei and cytoplasm disappearing and fibrous stroma only remaining. At such places the cells were frequently well preserved around the bloodvessels, which were thus surrounded by a mantle of cells. There was very little myxoid change present. At some places, however, small areas of softening could be seen. The epithelial part of the tumor consisted of irregularly arranged glandular structures lined with cylindrical or cuboidal cells separated by a stroma moderately rich in cells. At some places two rows of epithelial cells lined the tubules. At many places the connective tissue pushed apparently the gland cells into the tubules, so that an intracanalicular

FIG. 4.



adenomatous growth resulted. At such places the epithelium frequently became quite flat. The intruding connective tissue was often homogeneous, apparently gelatinous, and stained strongly with eosin. At other places the tubules grew in different directions through the connective tissue, so that little of the latter remained distinguishable. At the margin of some pieces the gland cells filled the alveoli—at least the appearance of alveoli filled with epithelial cells presented itself. The connective tissue surrounded by the tumor cells became necrotic, and then the epithelial masses grew diffusely as a carcinomatous growth into the surrounding tissue. There is no doubt about the malignant character of both the constituent parts of this mixed tumor. The sarcoma made a small metastasis in the lung, and it was continuously growing (mitoses); it was transplanted in a number of generations into other rats. It preserved its sarcomatous character during these transplantations, made contact metastases, and in one case many metastases in the peritoneal cavity. These metastases were always of the same type. The epithelial part had morphologically in some parts the character of a carcinoma, and also proved clinically its malignant character by growing through and destroying the surrounding tissue.

It is difficult to determine from which part of the glandular structures found in the rat in the neighborhood of the larynx the adenocarcinomatous part was derived. We can distinguish there in the normal rat at least four distinct parts, differing in their structure. In one of these only is colloid substance found. In the adenocarcinomatous part of the mixed tumor no colloid inside the tubules was found. We must leave it undecided from which of the different structures around the trachea in the region of the thyroid it was derived.

In this case the large part and the one at the distal end of the tumor were formed by the sarcoma; the smaller one and the one lying on the proximal side of the tumor was formed by the adenocarcinomatous structure. That makes it probable (although not certain) that the sarcomatous part was the one growing first, and that the adenocarcinomatous part began to grow only secondarily. In this connection it might be of interest to state that two other rats from which tumors were obtained for transplanting into rats were only affected by sarcomatous growth in the region of the thyroid. In the case reported here this sarcomatous growth seems to have been followed by an epithelial one.

Besides these four cases there have been reported by Förster, in 1860, two tumors of the thyroid gland, which he described as mixed sarcoma-carcinomata. One of these tumors had metastases in the lymph glands and in the lung. According to Förster, the main tumor consisted of mixed carcinomatous and sarcomatous parts. It affected the whole thyroid. In one jugular lymph gland sarcoma only was found. In a substernal metastasis carcinomatous structures only are said to have been present. In a second case, a man, aged fifty-eight years, this mixed growth is said to have started in one lobe of the thyroid, which at that time already had been changed into a struma. A metastasis in the manubrium sterni was pure sarcoma. Although it is quite likely that one or both of these tumors were mixed sarcoma and carcinoma, the description is not sufficient to make it certain.

We see from the cases just described that there exist in the thyroid gland a distinct variety of mixed tumors, namely, carcinosarcomata. Although, as we shall see later, one or two similar carcinosarcomata have been described at other places, the thyroid is the only place where such a series of cases of this type of mixed tumor has been described. A certain resemblance to these tumors can be found in some of the mixed tumors of the kidney. There also we find a growth of what appear to be sarcomatous elements and of glandular structures. Metastases have been found from such tumors which contained both the sarcomatous and the glandular elements; so, *e. g.*, a metastasis in the skin, in the case of Vogler. These cases are, however, different from the mixed tumors in the thyroid gland, inasmuch as they are probably always congenital, that the gland structures do not become typically carcinomatous, and that the distribution between the epithelial and apparently connective tissue structures is a different one. The relation of the small round cells surrounding the glandular structures and the latter is interpreted in a different way by different observers. In the mixed tumors of the kidney we usually find a more or less intimate mixture between these two elements; in the mixed tumors of the thyroid it is different. In the cases reported above we find a sarcomatous and a carcinomatous part separated. In Cases I., III., and IV. we find only a small zone in which both carcinomatous and sarcomatous elements are mixed; in Case II. this zone is somewhat larger; still both constituents are in the main separated; in Cases II., III., and IV., and probably also in the two cases of Förster, metastases were present which contained one or the other of the two parts of the tumor; in Case III., also, some mixed metastases were found. In no case were such elements present which, as Wilms believes, can always be found in mixed tumors, namely, growing indifferent cells, which at the same time at the margin of the tumor multiply without any differentiation taking place, and which in the more central parts of the tumor differentiate and give rise to the same tissues which they would have produced under normal conditions in the embryo.

Another question of interest is as to the age at which these tumors occurred. In Case I. the patient was aged sixty-seven years, in Case II. fifty-five years; in Case III. the dog was twelve years old, and in Case IV. the rat was full grown; in Förster's two cases the patients were aged thirty-nine and fifty-eight years, respectively. We see that the tumors were found in patients or animals of advanced age, and none in quite young individuals. According to the statistics of Morf, sarcoma of the thyroid is also mainly found among older people.

If we now consider the question of the etiology of these tumors we must ask if they can be explained as due to a disturbance of the embryonic development, which, according to Wilms, is at least one of the necessary conditions for all mixed tumors and also for sarcomata, even if they should be found in advanced age. As we saw, none of these tumors occurred soon after birth; almost all were found in advanced age. None of them shows the characteristic embryonic cell from which the other cells are derived by differentiation; the majority of the metastases show only one tissue. None of the conditions proving, according to Wilms, the embryonic origin of mixed tumors is to be found here. It is, however, well known that carcinoma, as well as sarcoma of the thyroid, is frequently preceded by a struma. In Cases I. and II., and in one case of Förster's, the history points to a struma preceding these mixed tumors. In the two cases observed in animals it is, of course, improbable that a slight preceding enlargement of the thyroid would have been noticed. Struma is an endemic disease caused by some condition, thus far unknown, connected with certain localities. This same condition is directly or indirectly in many cases also one of the causes of malignant tumor formation in the thyroid and, as we see also, of these mixed tumors. There exists, therefore, at present, no reason to connect these mixed tumors with irregularities of embryonic development. The widely accepted view that *all* mixed tumors must be explained as due to abnormalities of embryonic development does not, therefore, seem to be sufficiently sustained by facts.

We now have to consider the further question why we find in the mixed tumors of the thyroid gland the combination of sarcoma and carcinoma. Such combinations outside of the thyroid seem to be very rare. I have found one case described by Klein, and one other case reported by Lubarsch, which should in all probability be regarded as sarcocarcinoma.

CASE I. — Klein, "Pathologisch-histologische Studie über eine seltene Combination von Sarcom und Carcinom der Nasenhöhle," Dissertation, Würzburg, 1898. This tumor was observed in a woman, aged thirty-four years. After previous bleeding from the nose in 1893 polypi appeared in the left half of the nose. In 1894 the left nasal cavity became entirely occluded. In the beginning of 1895 the left nasal cavity and the nasopharynx were filled with soft tumor masses. They seemed to originate from the base and the posterior part of the nose, and they broke through into the orbita, the oral cavity, and into the alveolar cavity of an extracted tooth. A part of this tumor consisted of an angiosarcoma, with large cells and giant cells. It penetrated, as a round-celled sarcoma, the cartilaginous septum. Pieces from the tumor near the osseous septum showed a carcinomatous character. The epithelium of the osseous septum and of the floor of the nose was changed into thick, stratified epithelium. Carcinomatous cells penetrated into the Haversian canals.

CASE II.—Lubarsch describes a tumor (" Zur Lehre von den Geschwülsten und Infectionskrankheiten," Wiesbaden, 1899) which he found in the liver of a man, aged seventy-six years. There were adenomatous and carcinomatous parts present. Between the carcinomatous structures masses of connective tissue elements were found which resembled very much sarcomatous cells. The cells were polymorphous and the nuclei hyperchromatic. Some of the tumor nodules consisted almost entirely of sarcomatous structures. The metastases consisted partially of adenomatous and partially of sarcomatous structures, including perhaps some remains of epithelial elements, and, lastly, of carcinomatous nodules, which contained in the periphery much connective tissue. A small metastasis in the serosa of the intestines consisted almost exclusively of sarcomatous cells. Lubarsch believes this tumor to be a true sarcocarcinoma.

The case of Klein resembles the sarcocarcinomata of the thyroid also in this respect, that the sarcomatous and carcinomatous parts were probably mixed only in a small zone. In the case of Lubarsch the relation between the two elements seems to have been a more intimate one. It therefore appears that outside of the thyroid only very few sarcocarcinomata have been reported. Is it entirely accidental that the majority occurs in the thyroid? That is probably not the case. Two facts might be cited which speak against this view: 1. In Cases I. and II., and in one case of Förster's, both the sarcoma and carcinoma affected the same lobe; in the other cases this may also have been the case in the beginning. The tumors were, however, too large when examined to permit a definite opinion about this point. In all cases, however, the two constituents adjoined and penetrated each other to a slight degree only. These facts speak in favor of the view that they originated in the same part and not in different parts of the thyroid. If we had to deal with an accidental occurrence in the majority of these tumors the two constituent parts ought to have started in different parts. 2. The thyroid is distinguished from many other parts of the body by the fact that sarcomata and carcinomata originate there under similar conditions. Frequently in other organs sarcomata are found in young, carcinomata in old persons. In the thyroid sarcomata and carcinomata both are mainly found in older people. Further, the predisposing conditions for sarcoma and carcinoma, as far as they are known, are usually not identical in other parts of the body. In the tongue, *e. g.*, leucoplakia frequently precedes carcinoma. It is not known, however, that leucoplakia favors also sarcoma in the tongue. In the thyroid gland, however, both carcinoma and sarcoma occur in the majority of cases in thyroids previously affected by struma. Further, carcinoma and sarcoma are the most frequent tumors of the thyroid. These facts might help to explain the relative frequency of this combination of tumors in the thyroid gland, which is the more remarkable as the simultaneous occurrence of sarcoma (or endothelioma) and carcinoma even in different parts of the body seems to be rare. Wells collected seventeen cases of this kind. The occurrence of multiple simultaneous carcinoma seems much more frequent. I have observed three double carcinomata in cattle, in which carcinoma is relatively rare.[1] If we consider the great rarity of the combination of sarcoma and carcinoma elsewhere, I think it probable that there are still other factors present which cause the simultaneous growth of carcinoma and sarcoma from the same part of the thyroid. Nothing about the character of these factors can be stated until our knowledge of the causes of tumors in general is more definite. It is also remarkable that this same combination of sarcoma and carcinoma of the thyroid occurs in three different species of animals.

Besides the mixture of carcinoma and sarcoma there have been reported two sarcomata of the thyroid in which bone was mixed with the sarcomatous tissue. 1. Förster reported in a woman, aged sixty years, a sarcoma of the right lobe of the thyroid. In the centre of the tumor true bone was found surrounded by somewhat denser fibrous tissue. The bone seemed to be growing. 2. Pick found in a spindle-celled sarcoma of the left lobe of the thyroid, in a woman aged fifty-one years, bone mixed with sarcomatous tissue. The bone seemed to be growing; osteoblasts were found. At other places parts of the sarcoma assumed gradually the appearance of a tissue poorer in cells, resembling finally osteoid tissue. Similar conditions were present in a metastasis in the lung; other metastases, however, were free from bone. In this case the bone seemed to be formed directly through transformation of sarcomatous tissue. The sarcoma cells preserved their character also in the metastasis.

If we assume, with Wilms, that the sarcoma cells in this case are really not cells of connective tissue of the adult thyroid, but correspond to embryonic cells which undergo partially a further development to bone, we would have to regard these tumors, too, as true mixed tumors, best to be explained by the theory of a disturbance of embryonic development. Against this explanation speaks the fact that bone formation has also been found in struma. (Lücke, Kahn.) It is quite likely that in the case of Förster, cited above, the bone was originally formed in a struma, and that the development of sarcoma was only secondary.

We have no reason to believe that the bone formation in a sarcomatous thyroid must have a cause different from the bone formation in a struma, especially since a struma so frequently precedes a malignant tumor of the thyroid. There is, however, just as little reason to believe that the bone formation in a struma is caused by irregularities of embryonic development as it would be in the case of bone formation in the valves of the heart or tuberculous foci of the lung.

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[1] Carcinoma in Cattle, Medicine, 1900. Besides the two cases mentioned here, I observed one case in which both kidneys were affected.

All these facts and considerations do not exclude the theory that some developmental abnormalities might, nevertheless, have been the cause of the origin of both these kinds of tumors of the thyroid; they prove, however, that the causes adduced to demonstrate such an origin for other mixed tumors cannot be applied to the mixed tumors of the thyroid, and that therefore the fact that a tumor contains, besides the ordinary stroma, more than one constituent, is in itself not sufficient to prove its embryonic origin.

SUMMARY. 1. In the thyroid gland there have been found in man and in different species of animals mixed tumors of the type of carcinosarcoma. All the tumors described so far have certain characteristic points in common. Although carcinosarcomata occur in other places, the majority of them have been found in the thyroid. There also are found in the thyroid gland combinations of new-formed bone and sarcoma. *The facts which have been cited in favor of the embryonic origin of mixed tumors cannot be applied in the case of these mixed tumors. The fact that the tumor is a mixed tumor, therefore, is in itself not sufficient to prove its embryonic origin.* 2. It is not possible to determine with certainty, from the character of the constituent parts of a mixed tumor, from what kind of embryonic cells such a tumor is derived. Heterotopic tumor formations need not necessarily be produced by displaced blastomeres.

NOTE.—Recently T. McCrae (New York Medical Journal, 1902, No. 15) published a case in which the upper part of the left lobe of the thyroid of a female patient, aged sixty-nine years, was enlarged and replaced by an adenomatous new-growth; the lower part presented the structure of a round-celled sarcoma. Metastases of the sarcomatous part were found in the chain of lymph glands extending from the thyroid to the stomach and also in the right lung. The stomach was the seat of a similar sarcoma. Considering the fact that no other abdominal tumors were present, that the same lobe of the thyroid was affected by both tumors, and that the connection between the two neoplasms in the left lobe of the thyroid was the same as in some of the tumors just described, it seems not unlikely that Dr. McCrae's case, which Dr. McCrae himself regards as a primary sarcoma of the stomach, is also one to be classed among the mixed tumors of the thyroid.

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THE PATHOLOGY OF LABIAL AND NASAL HERPES AND OF HERPES OF THE BODY OCCURRING IN ACUTE CROUPOUS PNEUMONIA, AND THEIR RELATION TO THE SO-CALLED HERPES ZOSTER.[1]

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Our knowledge of herpes zoster was very much extended by the recent contribution of Head and Carpenter.[2] These authors showed, among other things: 1. That herpes zoster (in 18 cases, at least) is associated with destructive, and usually inflammatory, changes in the sensory ganglia (posterior root or Gasserian) corresponding to the nerve supply of the part affected with herpes. 2. That in recent cases (before the eleventh day) degenerative changes are not demonstrable in either the peripheral nerves, the posterior root fibres, or the central nervous system. 3. That in cases examined after the lapse of this period degenerative changes are present in these structures and apparently correspond to the affected areas in the ganglia. Their work was based upon the study of 21 cases in all stages of the eruption. They state that before their own work there were only two well-reported autopsies on cases of herpes ophthalmicus (Wys and Sattler) and five satisfactory reports on zoster of the trunk (Lesser, Chandelux and Dubler). Von Bärensprung's oft-quoted case is classified as unsatisfactory, because, though he noted the occurrence of hemorrhage into a ganglion, he failed to mention to which of the three ganglia removed he alluded.

While this valuable communication has placed our knowledge of herpes zoster on a substantial basis, it is clear that more light is needed

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[1] Read at the Seventeenth Annual Meeting of the Association of American Physicians, held in Washington, D. C., 1902.

[2] Brain, Autumn, 1900.